1
00:00:12,000 --> 00:00:04,000
[Music]

2
00:00:12,000 --> 00:00:16,000
Hi there and welcome to NASA’s Goddard Space Flight Center in Greenbelt Maryland - home to

3
00:00:16,000 --> 00:00:20,000
the nation’s largest organization of scientists, engineers, and technologists.

4
00:00:20,000 --> 00:00:24,000
Our work encompasses the core disciplines of Earth science,

5
00:00:24,000 --> 00:00:28,000
planetary science, heliophysics, which is the study of the Sun and space weather,

6
00:00:28,000 --> 00:00:32,000
and astrophysics, which covers the whole cosmos.\h\h

7
00:00:32,000 --> 00:00:36,000
These lines of businesses have helped guide the success of several notable missions,

8
00:00:36,000 --> 00:00:40,000
including\hthe Hubble Space Telescope, the Mars Atmosphere and Volatile Evolution Mission,

9
00:00:40,000 --> 00:00:44,000
OSIRIS-REx, which is on its way back to Earth with a sample of an asteroid,

10
00:00:44,000 --> 00:00:48,000
and a host of other satellites that monitor Earth, our changing climate

11
00:00:48,000 --> 00:00:52,000
and the dynamic universe.

12
00:00:52,000 --> 00:00:56,000
My name is Travis Wohlrab, and I’m an engagement officer here at Goddard.

13
00:00:56,000 --> 00:01:00,000

And I’m Courtney Lee, a video producer here at the flight center. Our campus

14
00:01:00,000 --> 00:01:04,000
at Greenbelt contains thirty-four buildings over twelve hundred acres,

15
00:01:04,000 --> 00:01:08,000
which translates to over three million square feet of research space.

16
00:01:08,000 --> 00:01:12,000
but Goddard consists of more than just the Greenbelt campus.

17
00:01:12,000 --> 00:01:16,000
We have five other locations: Wallops Flight Facility in Virginia the Goddard

18
00:01:16,000 --> 00:01:20,000
Institute for Space Studies in New York the Katherine Johnson Independent

19
00:01:20,000 --> 00:01:24,000
Verification and Validation Facility in West Virginia the Columbia Scientific

20
00:01:24,000 --> 00:01:28,000
Balloon Facility in Texas, and the White Sands Complex in New Mexico.

21
00:01:28,000 --> 00:01:32,000
Today we’re going take a tour of some of our facilities.

22
00:01:32,000 --> 00:01:36,000
A substantial amount of work is required to get a mission off the ground. Goddard is unique

23
00:01:36,000 --> 00:01:40,000
in that every element of a mission can be facilitated here; from designing,

24
00:01:40,000 --> 00:01:44,000
manufacturing, launching, controlling, and ultimately gathering

25
00:01:44,000 --> 00:01:48,000
and analyzing data, this NASA facility is a one-stop-shop!

26
00:01:48,000 --> 00:01:52,000
Our first stop is at the Visitor Center where everyone can come and learn

27
00:01:52,000 --> 00:01:56,000
about what we do. From strolling through our Rocket Garden to immersing yourself

28
00:01:56,000 --> 00:02:00,000
in our Solarium which explores our Sun through art and technology,

29
00:02:00,000 --> 00:02:04,000
the Visitor Center has multiple interactive exhibits for people to learn more

30
00:02:04,000 --> 00:02:08,000
more about Goddard’s research. Travis: But the Visitor Center isn’t the only place where

31
00:02:08,000 --> 00:02:12,000
you can see our research on display. We’re going to take you behind the gate on an

32
00:02:12,000 --> 00:02:16,000
exclusive tour of our facilities. Come on, let’s go!

33
00:02:16,000 --> 00:02:20,000
[Music Fades]

34
00:02:20,000 --> 00:02:24,000
[Music] Narrator: Before any mission becomes reality, it goes through several stages of development and plann

35
00:02:24,000 --> 00:02:28,000
At Building 34, scientists think of problems that need to be

36
00:02:28,000 --> 00:02:32,000
solved and get funding to develop practical solutions.

37
00:02:32,000 --> 00:02:36,000
For example, the employees at the Sample Analysis at Mars Suite Investigation,

38
00:02:36,000 --> 00:02:40,000

also known as SAM, examine the habitability of Mars.

39
00:02:40,000 --> 00:02:44,000
I’m here at the SAM Lab, and as you can see, it’s quite a tight space

40
00:02:44,000 --> 00:02:48,000
due to the temporary clean tent. But every day

41
00:02:48,000 --> 00:02:52,000
scientists conduct experiments and investigations to determine if

42
00:02:52,000 --> 00:02:56,000
ancient Mars provided a habitable environment where microbial life might

43
00:02:56,000 --> 00:03:00,000
have thrived. SAM was built on mass spectrometer

44
00:03:00,000 --> 00:03:04,000
technologies that had been developed to explore the atmospheres of Jupiter,

45
00:03:04,000 --> 00:03:08,000
Venus, and Saturn’s moon, Titan. In addition to measuring

46
00:03:08,000 --> 00:03:12,000
atmospheric gases, SAM also measures gases released from rocks and

47
00:03:12,000 --> 00:03:16,000
soils on Mars. Let’s hear more about SAM

48
00:03:16,000 --> 00:03:20,000
from the SAM Deputy Principal Investigator, Charles Malespin.

49
00:03:20,000 --> 00:03:24,000
Here we have the SAM test bed, which is an exact working replica of SAM, which is located

50
00:03:24,000 --> 00:03:28,000
in the Curiosity Rover on Gale Crater Mars. SAM

51
00:03:28,000 --> 00:03:32,000
took about seven years to complete, from a proposal in 2004 to a

52
00:03:32,000 --> 00:03:36,000
2011 launch, and required one hundred fifty people in it’s creation

53
00:03:36,000 --> 00:03:40,000
After landing on Mars in August of 2012

54
00:03:40,000 --> 00:03:44,000
It is still operating on the surface after eight and a half years.

55
00:03:44,000 --> 00:03:48,000
Goddard scientists and engineers

56
00:03:48,000 --> 00:03:52,000
solved problems that arose as SAM was being developed. For example

57
00:03:52,000 --> 00:03:56,000
When the company that was providing the 52 microvalves in SAM went out of business

58
00:03:56,000 --> 00:04:00,000
Goddard stepped up to reinvent the valves, which are still

59
00:04:00,000 --> 00:04:04,000
being used in missions today. In another situation, the turbomolecular pumps

60
00:04:04,000 --> 00:04:08,000
weren’t reaching their planned lifetimes. A Goddard team

61
00:04:08,000 --> 00:04:12,000
worked with the commercial provider to redesign the pumps, and they were still operating on Mars

62
00:04:12,000 --> 00:04:16,000
With SAM and other missions, we focused

63
00:04:16,000 --> 00:04:20,000

on solving problems to create instruments, that will help answer the

64
00:04:20,000 --> 00:04:24,000
questions we have about the universe beyond our planet. Thank you Charles

65
00:04:24,000 --> 00:04:28,000
With missions like SAM and others we implement a project life cycle

66
00:04:28,000 --> 00:04:32,000
where we use scientific findings from current missions to develop

67
00:04:32,000 --> 00:04:36,000
new missions. We head to the Planetary Environments Laboratory,

68
00:04:36,000 --> 00:04:40,000
where a new spacecraft element is being developed.

69
00:04:40,000 --> 00:04:44,000
Narrator: The Planetary Environments Laboratory studies the atmospheres

70
00:04:44,000 --> 00:04:48,000
and surfaces of planetary bodies. Scientists there

71
00:04:48,000 --> 00:04:52,000
participate in all phases of planetary investigation, from developing instruments

72
00:04:52,000 --> 00:04:56,000
to analyzing data sent back to us from spacecraft.

73
00:04:56,000 --> 00:05:00,000
The Planetary Environments Laboratory is the home to a key instrument on Dragonfly

74
00:05:00,000 --> 00:05:04,000
a rotorcraft scheduled to land on Titan, which is Saturn’s largest moon,

75
00:05:04,000 --> 00:05:08,000
in 2034.

76
00:05:08,000 --> 00:05:12,000
[Music]

77
00:05:12,000 --> 00:05:16,000
The team is currently working to design every detail of the craft, and the instruments on

78
00:05:16,000 --> 00:05:20,000
it’s Scientific payload. Here with us is Project Lead Dr. Melissa Trainer

79
00:05:20,000 --> 00:05:24,000
Who will tell us more about Dragonfly. Well we’ve already presented the mission concept

80
00:05:24,000 --> 00:05:28,000
to the rest of NASA, Now our engineering team is hard at work

81
00:05:28,000 --> 00:05:32,000
making sure we’ve thought through all the potential problems in the design.

82
00:05:32,000 --> 00:05:36,000
In this phase, it’s a lot like going from an architect’s sketch of a house,

83
00:05:36,000 --> 00:05:40,000
to a blueprint where every beam and outlet are clearly marked.

84
00:05:40,000 --> 00:05:44,000
We end up spending a lot of time in this stage, where we test

85
00:05:44,000 --> 00:05:48,000
prototypes and plan details, because we want to get it right

86
00:05:48,000 --> 00:05:52,000
before actually build the spacecraft and the instruments.

87
00:05:52,000 --> 00:05:56,000
An example of one design change we’ve experienced, comes with the instrument that drills

88
00:05:56,000 --> 00:06:00,000

samples from the Titan surface, and how it brings them to the Dragonfly

89
00:06:00,000 --> 00:06:04,000
mass spectrometer, which is the instrument we're building here. At first,

90
00:06:04,000 --> 00:06:08,000
the delivery system was designed to look like a funnel to dump samples on to a tray.

91
00:06:08,000 --> 00:06:12,000
But then we realized there were a couple of problems with that model.

92
00:06:12,000 --> 00:06:16,000
First, Titan's samples can be sticky, especially if you warm

93
00:06:16,000 --> 00:06:20,000
them up compared to the Titan surface, and it would be hard to clear them off

94
00:06:20,000 --> 00:06:24,000
the tray before more samples are taken. Second, the gravity

95
00:06:24,000 --> 00:06:28,000
on Titan is low compared to Earth, and we can't rely on the samples

96
00:06:28,000 --> 00:06:32,000
settling easily on the tray. So instead we came up with a

97
00:06:32,000 --> 00:06:36,000
new design that catches particles from a stream, into a cup

98
00:06:36,000 --> 00:06:40,000
and moves them into a chamber. We've also worked a detailed design

99
00:06:40,000 --> 00:06:44,000
where the sample chamber sides stays cold, like the surface of Titan,

100
00:06:44,000 --> 00:06:48,000
While the mass spectrometer side stays warmer.

101
00:06:48,000 --> 00:06:52,000
This interface is critical to getting the best measurements of Titan’s surface samples

102
00:06:52,000 --> 00:06:56,000
and it has already been through testing here at Goddard. Now, our team

103
00:06:56,000 --> 00:07:00,000
is continuing the work to make sure that everything fits into the

104
00:07:00,000 --> 00:07:04,000
rotorcraft lander in a way that makes sense and allows us to accomplish

105
00:07:04,000 --> 00:07:08,000
our science mission on Titan. Thanks Melissa, now let’s head over to another part of

106
00:07:08,000 --> 00:07:12,000
campus, which will help us further prepare the spacecraft for launch.

107
00:07:12,000 --> 00:07:16,000
Narrator: Once a spacecraft component has been developed, it has to be cleared for launch

108
00:07:16,000 --> 00:07:20,000
in one of our clean rooms, which can range in size up to almost 37,000 cubic meters.

109
00:07:20,000 --> 00:07:24,000
All of this occurs in the Integration and Testing, or

110
00:07:24,000 --> 00:07:28,000
I&T Complex, which is comprised of four buildings, Goddard

111
00:07:28,000 --> 00:07:32,000
Environmental Test Engineering and Integration facility ensures every

112
00:07:32,000 --> 00:07:36,000
craft is space-ready by putting it through a series of high-stress tests.

113
00:07:36,000 --> 00:07:40,000

Built in 1989, the Space Craft Systems Development and

114
00:07:40,000 --> 00:07:44,000
Integration facility or SSDIF, is the largest cleanroom in North America.

115
00:07:44,000 --> 00:07:48,000
It has an entire wall of 1,600 air filters to help protect

116
00:07:48,000 --> 00:07:52,000
equipment from contaminants, that means the air gets recycled every 60 to 90 seconds.

117
00:07:52,000 --> 00:07:56,000
To tell us more about the cleanroom we're here with Delaney Burkart,

118
00:07:56,000 --> 00:08:00,000
an integration engineer. The SSDIF cleanroom is like a

119
00:08:00,000 --> 00:08:04,000
surgeon's operating room. It prevents dirt, dust, and other

120
00:08:04,000 --> 00:08:08,000
contaminants from damaging spacecraft components. The largest source

121
00:08:08,000 --> 00:08:12,000
of this contamination is us, the personnel working on those components.

122
00:08:12,000 --> 00:08:16,000
To enter the room, you first must pass through an air shower.

123
00:08:16,000 --> 00:08:20,000
Then wear a sterile body suit, head cover, boots,

124
00:08:20,000 --> 00:08:24,000
gloves, and face mask, which takes about ten minutes to put on.

125
00:08:24,000 --> 00:08:28,000
Unlike a speck of dirt on a camera, a speck on a telescope

126
00:08:28,000 --> 00:08:32,000
lens cannot be easily removed if the spacecraft is far away

127
00:08:32,000 --> 00:08:36,000
studying distant stellar objects. Once the spacecraft is built, we move on to

128
00:08:36,000 --> 00:08:40,000
testing. Getting is ready for spaceflight conditions.

129
00:08:40,000 --> 00:08:44,000
To make sure the spacecraft can withstand the sounds

130
00:08:44,000 --> 00:08:48,000
it might encounter during its flight. Scientists test the craft

131
00:08:48,000 --> 00:08:52,000
in a 13-meter tall acoustic testing chamber. We're here with Test Engineer Yan Lui

132
00:08:52,000 --> 00:08:56,000
to tell us more about how the chamber works. In this chamber here, a scientist

133
00:08:56,000 --> 00:09:00,000
use altering flows of gaseous nitrogen to produce sounds

134
00:09:00,000 --> 00:09:04,000
as high as 150 decibels. In other words, 20 decibels

135
00:09:04,000 --> 00:09:08,000
louder than the roar of a jet engine. Using six foot speakers,

136
00:09:08,000 --> 00:09:12,000
the sounds blare in a two minute test to make sure instruments can withstand

137
00:09:12,000 --> 00:09:16,000
such noises. After the acoustics test we need to replicate the conditions

138
00:09:16,000 --> 00:09:20,000

the craft might encounter in space, which is right around the corner.

139
00:09:20,000 --> 00:09:24,000
The Space Environment Simulator,

140
00:09:24,000 --> 00:09:28,000
operational since 1962, is a thermal vacuum chamber

141
00:09:28,000 --> 00:09:32,000
designed to expose spacecraft components to spaceflight conditions.

142
00:09:32,000 --> 00:09:36,000
Well what do those conditions look like? We’re talking about an almost

143
00:09:36,000 --> 00:09:40,000
400 degree temperature range. From negative 233 degrees celsius to

144
00:09:40,000 --> 00:09:44,000
150 degrees celsius. The range

145
00:09:44,000 --> 00:09:48,000
is achieved by passing liquids through thermal shrouds for cold temperatures

146
00:09:48,000 --> 00:09:52,000
or using thermal lamps for high temperatures. Our simulator is roughly

147
00:09:52,000 --> 00:09:56,000
12 meters tall and 8 meters across. It operates with

148
00:09:56,000 --> 00:10:00,000
massive mechanical vacuum pumps, which are like huge versions of the vacuum

149
00:10:00,000 --> 00:10:04,000
cleaners people use at home. We have cryopumps to condense remaining gasses

150
00:10:04,000 --> 00:10:08,000
out of the chamber. The mechanical pumps and the cryopumps work together

151
00:10:08,000 --> 00:10:12,000
to eliminate almost all of the air in the chamber. You wouldn’t

152
00:10:12,000 --> 00:10:16,000
want to be inside while that is happening. It is just a billionth of

153
00:10:16,000 --> 00:10:20,000
Earth’s normal atmospheric pressure. It takes up to 12 hours

154
00:10:20,000 --> 00:10:24,000
to pump the chamber down to that pressure and 2 to 4 days to go

155
00:10:24,000 --> 00:10:28,000
back to room temperature. And we’re not done yet! Next the instruments

156
00:10:28,000 --> 00:10:32,000
gets tested in the high capacity centrifuge. Built in

157
00:10:32,000 --> 00:10:36,000
1965, this used to be an all-in-one machine. It’s not designed for astronauts

158
00:10:36,000 --> 00:10:40,000
however it used to be able to test environmental, vibration

159
00:10:40,000 --> 00:10:44,000
acoustic and G-force conditions. As our spacecraft grew in size

160
00:10:44,000 --> 00:10:48,000
it had to be modified. The centrifuge now only simulates the acceleration

161
00:10:48,000 --> 00:10:52,000
level of a rocket during the launch phase, typically about 10 G’s.

162
00:10:52,000 --> 00:10:56,000
This allows scientists to see how stress affects a craft’s structure

163
00:10:56,000 --> 00:11:00,000

and verify that it can withstand launch. It can rotate at

164
00:11:00,000 --> 00:11:04,000
155 miles per hour, our test limit is 30 G’s,

165
00:11:04,000 --> 00:11:08,000
or 30 times the gravity we have on Earth. The centrifuge draws

166
00:11:08,000 --> 00:11:12,000
one gigawatt of electricity, and when in use generates

167
00:11:12,000 --> 00:11:16,000
200 mile per hour winds. It’s been used for more than just spacecraft testing

168
00:11:16,000 --> 00:11:20,000
in 2002, NASA partnered with the NTSB

169
00:11:20,000 --> 00:11:24,000
to test SUVS and analyze the tipping point for manufactured models.

170
00:11:24,000 --> 00:11:28,000
Once a spacecraft has passed all testing phases, it’s go for launch.

171
00:11:28,000 --> 00:11:32,000
Narrator: For many Goddard launches

172
00:11:32,000 --> 00:11:36,000
we head to the beaches of Virginia. Wallops Flight Facility is NASA’s only

173
00:11:36,000 --> 00:11:40,000
owned and operated launch range for a variety of vehicles.

174
00:11:40,000 --> 00:11:44,000
including research aircraft, sounding rockets, scientific balloons,

175
00:11:44,000 --> 00:11:48,000
orbital vehicles, and unmanned aerial vehicles.

176
00:11:48,000 --> 00:11:52,000
It’s America’s oldest, continuously operating rocket range. With launches

177
00:11:52,000 --> 00:11:56,000
operations dating back to the summer of 1945.

178
00:11:56,000 --> 00:12:00,000
Wallops provides low-cost opportunities to conduce scientific experiments

179
00:12:00,000 --> 00:12:04,000
and for engineers to test their technologies ahead

180
00:12:04,000 --> 00:12:08,000
of their main missions. Many services support these tests, including

181
00:12:08,000 --> 00:12:12,000
integration and testing facilities, launchers and runways, as well as

182
00:12:12,000 --> 00:12:16,000
tracking and data services. Let's head to the launch viewing area

183
00:12:16,000 --> 00:12:20,000
where Sam Henry is going to tell us more about the launch cycle. There are many

184
00:12:20,000 --> 00:12:24,000
moving parts that go into a mission so everything can come together on launch day.

185
00:12:24,000 --> 00:12:28,000
Depending on the vehicle, technicians may arrive anywhere from 4 to 8 hours

186
00:12:28,000 --> 00:12:32,000
ahead of T minus zero, to begin testing on a vehicle and support system

187
00:12:32,000 --> 00:12:36,000
to make sure everything is ready, public safety is a top

188
00:12:36,000 --> 00:12:40,000

priority, so we launch our rockets over the ocean. Surveillance teams will

189
00:12:40,000 --> 00:12:44,000
monitor boat and air traffic before the rocket can take flight

190
00:12:44,000 --> 00:12:48,000
Weather also plays an important role on launch day. Meteorologists give weather updates

191
00:12:48,000 --> 00:12:52,000
from 72 hours until minutes just before launch. So teams

192
00:12:52,000 --> 00:12:56,000
can be as prepared as possible. Winds, severe weather, and cloud thickness

193
00:12:56,000 --> 00:13:00,000
are the biggest concerns on launch day. When conditions align,

194
00:13:00,000 --> 00:13:04,000
we are a go for launch and ready to safely conduct our range operations.

195
00:13:04,000 --> 00:13:08,000
I'll head back to the control room where Courtney and I

196
00:13:08,000 --> 00:13:12,000
will tell you more about other Wallops missions and responsibilities.

197
00:13:12,000 --> 00:13:16,000
Wallops conducts research here on Earth, as well as in a near

198
00:13:16,000 --> 00:13:20,000
space environment, looking deep into the cosmos. Wallops manages

199
00:13:20,000 --> 00:13:24,000
NASA's scientific balloon and sounding rockets program.

200
00:13:24,000 --> 00:13:28,000
Which are launched not only from the flight facility in Virginia, but from areas across the globe.

201
00:13:28,000 --> 00:13:32,000
As far North as Norway and as South as Antarctica.

202
00:13:32,000 --> 00:13:36,000
Sam: On average we fly 10 to 20 scientific balloon launches each year.

203
00:13:36,000 --> 00:13:40,000
These platforms allow researchers a chance to gather data with flights in the stratosphere

204
00:13:40,000 --> 00:13:44,000
a near space environment. Flights can run up to weeks at a time

205
00:13:44,000 --> 00:13:48,000
depending on science mission requirements. Sounding rockets are manufactured

206
00:13:48,000 --> 00:13:52,000
tested and launched from Wallops and remote locations

207
00:13:52,000 --> 00:13:56,000
many of these technology missions we support end up being integral to larger missions

208
00:13:56,000 --> 00:14:00,000
like Artemis. With around 20 missions a year, the sounding

209
00:14:00,000 --> 00:14:04,000
rocket program is one of Wallops' most active platforms.

210
00:14:04,000 --> 00:14:08,000
We also open our facilities to industries for space and aeronautics research.

211
00:14:08,000 --> 00:14:12,000
In the past 25 years, we've collaborated with over 50 established

212
00:14:12,000 --> 00:14:16,000
and emerging aerospace companies. We also support other government

213
00:14:16,000 --> 00:14:20,000

agencies with their tests, missions, and training exercises. We look forward

214
00:14:20,000 --> 00:14:24,000
to partnering with these groups and others in coming years. As you can see

215
00:14:24,000 --> 00:14:28,000
Wallops provides a large range of options when it comes to testing equipment

216
00:14:28,000 --> 00:14:32,000
or conducting near-Earth research. And you can often watch

217
00:14:32,000 --> 00:14:36,000
their launches online and join in on the action! Once the vehicle

218
00:14:36,000 --> 00:14:40,000
has been launched, we jet back to Goddard to run communications with the craft.

219
00:14:40,000 --> 00:14:44,000
Narrator: When the craft is finally in space, how do we communicate with it?

220
00:14:44,000 --> 00:14:48,000
Goddard has over 60 years of communications and navigation support, going back

221
00:14:48,000 --> 00:14:52,000
to the Mercury, Gemini and Apollo eras. Goddard’s Near Space

222
00:14:52,000 --> 00:14:56,000
Network coordinates all space-to-ground communications for missions near Earth.

223
00:14:56,000 --> 00:15:00,000
The Near Space Network enables missions to send back significant amounts

224
00:15:00,000 --> 00:15:04,000
of data for investigation and discovery. These include missions like The Hubble Space Telescope

225
00:15:04,000 --> 00:15:08,000
and the International Space Station. In fact, the network plays

226
00:15:08,000 --> 00:15:12,000
a crucial role in NASA’s human space exploration effort

227
00:15:12,000 --> 00:15:16,000
It provides the International Space Station with constant communications, letting astronauts working and living

228
00:15:16,000 --> 00:15:20,000
there to always have a connection back home. We are here with

229
00:15:20,000 --> 00:15:24,000
Rosa Avalos-Warren, a human spaceflight mission manager to tell us

230
00:15:24,000 --> 00:15:28,000
more about the Near Space Network. Goddard’s Exploration and Space Communications

231
00:15:28,000 --> 00:15:32,000
division oversees the Near Space Network. The network blends commercial providers

232
00:15:32,000 --> 00:15:36,000
and government assets to support missions from Earth’s

233
00:15:36,000 --> 00:15:40,000
orbit up to two million kilometers away. These missions include

234
00:15:40,000 --> 00:15:44,000
launch vehicles, robotic and science satellites, technology demonstrations,

235
00:15:44,000 --> 00:15:48,000
and human spaceflight missions. To communicate with astronauts and spacecraft

236
00:15:48,000 --> 00:15:52,000
we download signals from satellites and translate them

237
00:15:52,000 --> 00:15:56,000
into recognizable data. This data ensures mission success for NASA

238
00:15:56,000 --> 00:16:00,000

The network is involved in a variety of missions, including NASA’s commercial crew

239
00:16:00,000 --> 00:16:04,000
program, which provides communications and navigation support to companies like Space-X

240
00:16:04,000 --> 00:16:08,000
and Boeing. As we go to the Moon as part of the Artemis program, the network will provide

241
00:16:08,000 --> 00:16:12,000
telemetry, command, and tracking support to the missions as they launch into space.

242
00:16:12,000 --> 00:16:16,000
In doing so we work alongside the Jet Propulsion Laboratory’s Deep Space Network.

243
00:16:16,000 --> 00:16:20,000
We’re here with Brandon Bethune, the deputy project manager for the Near Space Network

244
00:16:20,000 --> 00:16:24,000
who will tell us more about some of the recent projects

245
00:16:24,000 --> 00:16:28,000
the scientists are working on. With missions like the Laser Communications Relay Demonstration

246
00:16:28,000 --> 00:16:32,000
and the Orion Artemis II Optical Communications System,

247
00:16:32,000 --> 00:16:36,000
we are infusing optical communications into our mission architectures. We are also

248
00:16:36,000 --> 00:16:40,000
advancing our radio frequency capabilities and integrating Ka-band

249
00:16:40,000 --> 00:16:44,000
capabilities into our network so missions can communicate more

250
00:16:44,000 --> 00:16:48,000
data, increasing our capacity for discovery. And that’s not all.

251
00:16:48,000 --> 00:16:52,000
We’re even implementing Delay/Disruption Tolerant Networking, which is a building block for NASA’s LunaNe

252
00:16:52,000 --> 00:16:56,000
a communications and navigation architecture at the Moon.

253
00:16:56,000 --> 00:17:00,000
Narrator: Our support to both human exploration and science investigation

254
00:17:00,000 --> 00:17:04,000
is always evolving and adapting to the needs of missions and empowering NASA’s vision.

255
00:17:04,000 --> 00:17:08,000
Thanks for joining us on this tour of Goddard

256
00:17:08,000 --> 00:17:12,000
Space Flight Center. We’ve seen the exhibits at the Visitor’s Center, explored the SAM lab,

257
00:17:12,000 --> 00:17:16,000
investigated how spacecraft are tested at the I&T Complex,

258
00:17:16,000 --> 00:17:20,000
launched a rocket at Wallops Flight Facility and coordinated communications at the

259
00:17:20,000 --> 00:17:24,000
Near Space Operation Control Center. We hope you enjoyed your tour

260
00:17:24,000 --> 00:17:28,000
of Goddard! If you want to learn more, you can visit our website or follow us on social media.